CLAIMS

1.   A method for forming a three dimensional object, said method comprising the steps of:

generating a digital representation of the object;

generating a digital representation of a first build style lattice having a predetermined, substantially uniform structure;

generating a digital representation of a second build style lattice having a structure similar to the first build style lattice;

overlaying the respective representations of the object, the first build style lattice and the second build style lattice;

intersecting the overlaid representations to generate a digital representation of the object incorporating the first build style lattice and the second build style lattice; and

fabricating the digital representation of the object.

2.   The method set forth in claim 1 wherein the fabricating step includes providing first material for the first lattice and a second material for the second lattice.

3.   The method set forth in claim 1 wherein the overlaying step includes shifting the position of the second build style lattice relative to the first build style lattice to interlace the first and second build style lattices.

4.   The method set forth in claim 1 wherein the first build style lattice includes a plurality of interconnected legs and nodes.

5.   The method set forth in claim 4 wherein the legs of the first build style lattice have a substantially uniform thickness.

6.   The method set forth in claim 4 wherein the second build style lattice includes a second plurality of interconnected legs and nodes having a substantially uniform thickness different from the thickness of the legs of first lattice.

7. The method set forth in claim 6 wherein the object has a first region and a second region, wherein said first and second build style lattices extend into the first region and the second region, and wherein the thickness of the legs of the first lattice and the thickness of the legs of the second lattice vary from the first region to the second region.

8. The method set forth in claim 7 wherein the thickness of the legs of the first build style lattice and the thickness of the legs of the second build style lattice vary inversely from the first region to the second region.

9. The method set forth in claim 1 wherein the first and second build style lattices are interlaced and define therebetween an interface.

10. The method set forth in claim 9 wherein the interface is substantially hollow.

11. The method set forth in claim 9 wherein the interface is occupied by a fluid.

12. The method set forth in claim 8 wherein the interface defines at least one channel for conducting a fluid along a predetermined path.

13. The method set forth in claim 8 wherein the interface is occupied by a solid material.

14. The method set forth in claim 13 wherein the interface is occupied by the legs of the first and second build style lattices.

15. The method set forth in claim 1 wherein the step of generating a digital representation of the object includes generating a representation of a boundary skin and wherein the fabricating step includes fabricating the boundary skin so that the first build style lattice supports the skin.

16.   The method set forth in claim 1 wherein the second build style lattice supports the skin.

17.   The method set forth in claim 4 wherein the legs of the first lattice are hollow and are interconnected.

18.   The method set forth in claim 1 wherein the legs of the first build style lattice define respective bores having an inner diameter and wherein the inner diameters of the bores vary to form at least one capillary.

19.   The method set forth in claim 1 wherein the step of generating a digital representation of the first build style lattice includes generating a representation of a plurality of legs and wherein the fabricating step includes fabricating at least one of the plurality of legs so as to be hollow.

20.   The method set forth in claim 19 wherein the step of generating a digital representation of the first build style includes the step of generating a digital representation of a third build style lattice, the overlaying step includes overlaying the digital representations of the first and third build styles and the intersecting step includes intersecting the digital representations of the first and third build styles to result in the representation of hollow legs in the first build style lattice.

21.   A three dimensional object comprising:

a first one-piece build style lattice including a plurality of substantially uniform build style units; and

a second one-piece build style lattice integrally formed with and interlaced with the first lattice, the second lattice including a plurality of substantially uniform build style units.

22.   The object set forth in claim 21 wherein the first lattice is made of a first material and the second build style lattice is made of a second material.

23.   The object set forth in claim 21 wherein the first build style lattice includes a plurality of interconnected legs and nodes.

24.   The object set forth in claim 23 wherein the legs of the first build style lattice have a substantially uniform thickness.

25.   The object set forth in claim 24 wherein the second build style lattice includes a second plurality of interconnected legs and nodes having a substantially uniform thickness different from the thickness of the legs of first lattice.

26.   The object set forth in claim 25 wherein the object has a first region and a second region, wherein said first and second build style lattices extend into the first region and the second region, and wherein the thickness of the legs of the first lattice and the thickness of the legs of the second lattice vary from the first region to the second region.

27.   The object set forth in claim 26 wherein the thickness of the legs of the first build style lattice and the thickness of the legs of the second build style lattice vary inversely from the first region to the second region.

28.   The object set forth in claim 21 wherein the first and second build style lattices define therebetween an interface.

29. The object set forth in claim 28 wherein the interface is substantially hollow.

5   30. The object set forth in claim 29 wherein the interface is occupied by a fluid.

31. The object set forth in claim 28 wherein the interface defines at least one channel for conducting a fluid along a predetermined path.

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32. The object set forth in claim 31 wherein the channel has a cross-section which narrows to define a capillary.

33. The object set forth in claim 28 wherein the interface is

15 occupied by a solid material.

34. The object set forth in claim 33 wherein the interface is occupied by the legs of the first and second build style lattices.

20 35. The object set forth in claim 21 wherein the object includes a boundary skin and wherein the first build style lattice supports the skin.

36. The object set forth in claim 35 wherein the second build style lattice supports the boundary skin.

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37. The object set forth in claim 23 wherein the legs of the first lattice are hollow.

38. The object set forth in claim 37 wherein the legs of the first

30 build style lattice define respective bores having an inner diameter and wherein the inner diameters of the bores vary to form at least one capillary.

39. The object set forth in claim 37 and further including a boundary skin supported by at least one of the first and second build style lattices.

40.   A three dimensional object formed through use of a free form fabrication method comprising the steps of:

generating a digital representation of the object including a representation of a surface of the object;

5   generating a digital representation of a first build style lattice having a predetermined, substantially uniform structure;

generating a digital representation of a second build style lattice having a structure similar to the first build style lattice;

intersecting the overlaid representations to generate a digital representation

10   of the object incorporating the first and second build style lattices; and

fabricating the digital representation of the object incorporating the first and second build style lattices to form a boundary skin, a first lattice integrally formed with and extending from the skin and a second lattice interlaced with the first lattice and integrally formed with and extending from the skin.

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